

55. (Amended) A via, comprising:

[a] an electrically conductive, nitride-free titanium alloy layer formed overlying walls and an exposed base layer of a contact hole;
a fill comprising a metal selected from the group consisting of tungsten and aluminum;
and
a titanium nitride layer interposed between the titanium alloy layer and the fill.

56. (Amended) A via, comprising:

[a] an electrically conductive, nitride-free titanium alloy layer formed overlying walls and an exposed base layer of a contact hole, wherein the titanium alloy layer comprises titanium and an element selected from the group consisting of zinc, cadmium, mercury, aluminum, gallium, indium, tin, silicon, germanium, lead, arsenic and antimony;
a fill comprising a metal selected from the group consisting of tungsten and aluminum;
and
a titanium nitride layer interposed between the titanium alloy layer and the fill.

60. (Amended) A via, comprising:

a first layer of [a] an electrically conductive, nitride-free titanium alloy within a contact opening in an insulating layer, wherein the titanium alloy comprises titanium and an element selected from the group consisting of zinc, cadmium, mercury, aluminum, gallium, indium, tin, silicon, germanium, lead, arsenic and antimony;
a second layer of titanium silicide coupled to the first layer; and
a fill coupled to the titanium alloy layer, wherein the fill comprises a metal selected from the group consisting of tungsten and aluminum.

66. (Amended) A via, comprising:

a first layer of [a] an electrically conductive, nitride-free titanium alloy within a high aspect ratio contact opening in an insulating layer, wherein the titanium alloy

comprises titanium and an element selected from the group consisting of zinc, cadmium, mercury, aluminum, gallium, indium, tin, silicon, germanium, lead, arsenic and antimony;

a second layer of titanium silicide coupled to the first layer; and

a fill coupled to the titanium alloy layer, wherein the fill comprises a metal selected from the group consisting of tungsten and aluminum.

73. (Amended) A via, comprising:

a first layer of [a] an electrically conductive, nitride-free titanium alloy on a sidewall of a high aspect ratio contact opening in an insulating layer, wherein the titanium alloy comprises titanium and an element selected from the group consisting of zinc, cadmium, mercury, aluminum, gallium, indium, tin, silicon, germanium, lead, arsenic and antimony;

a second layer of titanium silicide formed overlying an exposed semiconductor base layer of the contact hole;

a fill coupled to the titanium alloy layer, wherein the fill comprises a metal selected from the group consisting of tungsten and aluminum.

78. (Amended) A via, comprising:

a first layer of [a] an electrically conductive, nitride-free titanium alloy within a contact opening in an insulating layer, wherein the first layer is produced using a method including:

forming a seed layer supported by a substrate by combining a first precursor with a first reducing agent;

forming the titanium layer supported by the substrate by combining a titanium-containing precursor with the seed layer; and

filling the remaining space of the contact opening with a metal selected from the group consisting of tungsten and aluminum.